LETTERS TO THE EDITOR

Implications of the 2014 updated American Heart Association/American Stroke Association guidelines for symptomatic carotid patients

The 2014 American Heart Association/American Stroke Association (AHA/ASA) guidelines[1] for symptomatic patients updated the previous 2011 AHA/ASA recommendations.[2] Because "these Guidelines are addressed to all clinicians who manage secondary prevention of stroke in symptomatic patients,"[1] it is important to analyze the expected implications of these recommendations.

Carotid endarterectomy (CEA) is once again recommended for symptomatic patients with ipsilateral severe (70%-99%) or moderate (50%-69%) carotid stenosis (Class I; Level of Evidence A and B, respectively).[1] Carotid artery stenting (CAS) is once again "indicated as an alternative to CEA for symptomatic patients"[1]; however, this is now a Class IIa (not a Class I)[2] recommendation.[1] Furthermore, a new recommendation was added suggesting that "it is reasonable to consider patient age in choosing between CAS and CEA."[1] CEA might be associated with improved outcomes compared with CAS for patients >70 years, and for younger patients the two procedures are equivalent (Class IIa; Level of Evidence B).[1]

Several recommendations of the 2011[2] and the 2014 AHA/ASA guidelines[1] were largely based on the Carotid Revascularization Endarterectomy vs Stent Trial (CREST).[3] Results of CREST were published on May 26, 2010[3] and was followed by three subgroup analyses: one according to symptomatic status on February 9, 2011[4]; one according to sex on May 5, 2011[5]; and one according to age on October 6, 2011.[6] Because the 2011 AHA/ASA recommendations were published on October 21, 2010,[2] they could not have included the subsequent three CREST subgroup analyses.[4-6] This limitation, however, does not apply to the 2014 AHA/ASA guidelines.[1] Consequently, based on the CREST subgroup analysis according to age,[6] the 2014 AHA/ASA guidelines made a new recommendation according to patient age.[1] A similar differentiation would be expected based on the results of the other two CREST subgroup analyses.[4,5] Such a differentiation, however, was not made.

The CREST subgroup analysis according to symptomatic status showed that symptomatic patients who underwent CAS had nearly twofold greater periprocedural stroke and death rates compared with CEA (6.0 ± 0.9% vs 3.2 ± 0.7%, respectively; $P = .02$).[4] Because this subgroup analysis[4] was completely omitted in the 2014 AHA/ASA guidelines, it might explain why CAS is still indicated as an alternative to CEA for symptomatic patients.[1] Furthermore, although this is no longer a Class I,[2] but a Class IIa recommendation,[1] the phrase used (ie, "CAS is indicated") is a phrase used for Class I recommendations ("should", "is recommended," "is indicated," or "is useful/effective/beneficial").[1] The suggested phrases for Class IIa recommendations are "is reasonable," "is probably recommended or indicated," or "can be useful/effective/beneficial," as is the case, eg, with age: "it is reasonable to consider patient age…".[1] Although the Class of this recommendation was revised, the recommendation itself remained virtually the same.

In the abstract of the CREST subgroup analysis according to sex, it is mentioned that "there was no significant interaction in the primary end point between sexes (interaction $P = .34$)."[5] This information is replicated in the 2014 AHA/ASA guidelines.[1] However, in the full CREST report it is mentioned that women who underwent CAS had >2.5-fold greater periprocedural stroke and stroke/death rates compared with women who underwent CEA (hazard ratio, 2.63; $P = .013$).[5] It would therefore be expected that besides patient age, the 2014 AHA/ASA guidelines[1] would also differentiate their recommendations according to patient sex.

The 2014 AHA/ASA guidelines[1] is an influential document that is expected to guide clinical practice not only in the United States, but worldwide. The 2014 AHA/ASA guidelines[1] have revised and improved many of their previous recommendations[2]; some of them, however, might still be misinterpreted. It is essential to avoid any potential misinterpretations that could harm rather than benefit patients.

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Regarding "A simple technique to achieve bloodless excision of carotid body tumors"

We read with great interest the article by Spinelli et al[1] on "A simple technique to achieve bloodless excision of carotid body tumors," who described the "double-clamping" technique for Shamblin II-III carotid body tumor (CBT) resection to reduce

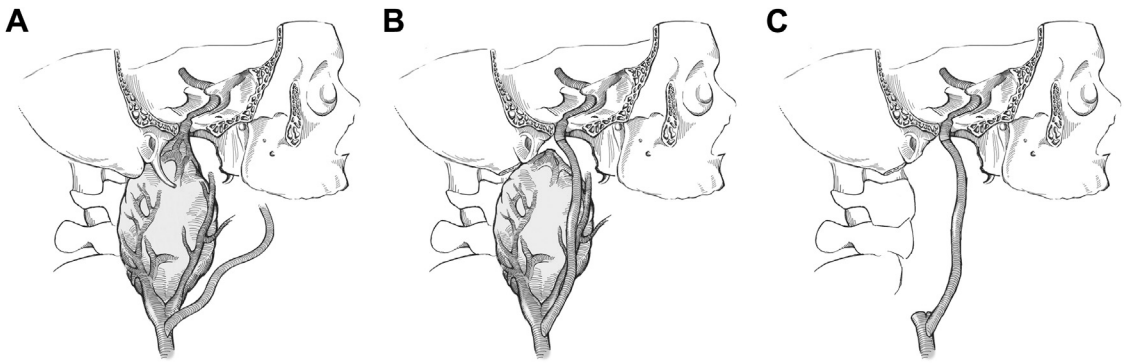

Fig. Artist's depiction shows the surgical steps of the modified technique for treatment of carotid body tumors (CBTs) involving the lateral skull base. **A,** The common carotid artery (CCA) was partially cross-clamped to perform an end vein-to-side artery proximal anastomosis. **B,** A cervical-to-petrous internal carotid artery (ICA) in situ bypass with an end-to-end cephalad anastomosis was reconstructed before excision of the lesion. **C,** The vein graft was placed in the bed of the ICA after the excision.

bleeding and neurologic complications during surgery. However, could this technique be successfully applied to the larger cases involving the lateral skull base? In our experience, the larger CBTs usually adhere severely to both carotid arteries, even extending to the common carotid artery (CCA), making it definitely difficult to pose the clamps to the external carotid artery and its branches.

From January 2010 to December 2013, six patients underwent surgery in our department for unilateral extended CBTs involving the lateral skull base. The size of lesions was 13.3 ± 1.6 cm, expressed as mean ± standard error of the mean. To safely remove the giant CBTs, we used a "pre-reconstruction" technique, which was performed in three steps:

In step 1, an end vein-to-side artery proximal anastomosis was performed under partial CCA cross-clamping to maintain the cerebral perfusion through the internal carotid artery (ICA; Fig, *A*). After the anastomosis, the clamp was removed to fill the graft with arterial blood.

In step 2, with the assistance of ear, nose, and throat surgeons for better exposure of the lateral skull base, reconstruction of the graft with an end-to-end cephalad anastomosis with the ICA was performed after controlling the ICA at its cranial base segment by a microbulldog clamp. Then, the clamp was removed to restore cerebral perfusion (Fig, *B*).

In step 3, the feeding vessels to the tumor from the external carotid artery were ligated, followed by complete excision of the tumor with the involved ICA (Fig, *C*).

All operations were technically successful, with no intraoperative or postoperative deaths or strokes.

In our opinion, interposition of a vascular conduit for the ICA may be indicated in cases of giant CBTs involving the lateral skull base because surgical ligation of the ICA without a shunt is associated with a high risk of stroke, which cannot be fully estimated by preoperative occlusive tests.[2,3] Besides, dissection of the bifurcation of the carotid artery is not feasible in giant lesions extending to the CCA. As a result, reconstruction of the ICA would be the best choice.

However, due to difficulty in the cerebral protection and exposing the cranial border of giant CBTs, such procedures are often considered challenging.[3] Among all of the obstacles for ICA reconstruction, how to prevent cerebral injury from a long ischemia time and subsequent ischemic-hyperfusion should be considered firstly. In our patients, we used the fractionated-clamping method to effectively solve the problem by dividing cerebral ischemia time into two short periods.

Moreover, by using our "pre-reconstruction" technique, we were able to reduce the blood loss by ligation of the feeding artery at an early stage. As a consequence, the cranial nerves were also well protected owing to the clearer operational field. Our work has shown the satisfactory result of using this "pre-reconstruction" technique. Nevertheless further studies are still required to get more information.

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